

Kentucky Injury Prevention and Research Center
Bona fide agent for Kentucky Department for Public Health
333 Waller Avenue, Suite 242 • Lexington, KY 40504 • 859-257-5839

INCIDENT HIGHLIGHTS



DATE:
April 23, 2024



TIME:
2:00 a.m.



VICTIM:
55-year-old non-Hispanic male



INDUSTRY/NAICS CODE:
General freight trucking /
484110



EMPLOYER:
Commercial carrier



SAFETY & TRAINING:
Formal safety program



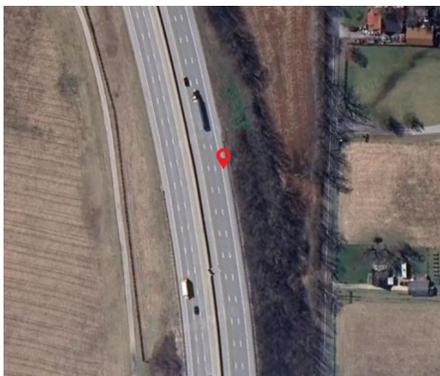
SCENE:
Interstate highway



LOCATION:
Kentucky



EVENT TYPE:
Motor vehicle crash



REPORT#: 24KY037

REPORT DATE: August 5, 2024

Truck Driver Killed After Semi-Trailer Wheel and Tire Cross Median, Strike Windshield

On April 23, 2024, a 55-year-old male commercial truck driver was traveling on a Kentucky interstate when a semi-trailer wheel and tire crossed the median and struck the vehicle he was operating. The victim succumbed to the injuries sustained in the incident.

[READ THE FULL REPORT>](#) (p.3)

CONTRIBUTING FACTORS

Key contributing factors identified in this investigation include:

- Mechanical failure

[LEARN MORE>](#) (p.10)

RECOMMENDATIONS

Kentucky investigators concluded that, to help prevent similar occurrences, employers should:

- Consider installing wheel-separation prevention devices;
- Consider providing hub and wheel-specific training to their maintenance technicians;
- Train and require drivers of commercial motor vehicles to conduct thorough equipment inspections and enforce requirement;
- Consider implementing an auditing process to ensure compliance with company procedures.

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[Kentucky FACE Program](#)



KENTUCKY

State **FACE** Program

Fatality Assessment & Control Evaluation

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Fatality Assessment and Control Evaluation Program

This case report was developed to draw the attention of employers and employees to a serious safety hazard and is based on preliminary data only. This publication does not represent final determinations regarding the nature of the incident, cause of the injury, or fault of employer, employee, or any party involved.

This case report was developed by the Kentucky Fatality Assessment and Control Evaluation (FACE) Program. Kentucky FACE is a National Institute for Occupational Safety and Health-funded occupational fatality surveillance program with the goal of preventing fatal work injuries by studying the worker, the work environment, and the role of management, engineering, and behavioral changes in preventing future injuries. The FACE program is located in the Kentucky Injury Prevention and Research Center (KIPRC). KIPRC is a bona fide agent for the Kentucky Department for Public Health.

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INTRODUCTION

On the night of April 22, 2024, a 55-year-old male commercial truck driver (victim) traveled from an out-of-state origin en route to a milk processing plant in Kentucky. In the early morning hours of the following day, April 23, 2024, while traveling on a Kentucky interstate, a semi-trailer wheel and tire crossed the median and struck the front hood area of the semi-truck he was operating. The wheel and tire continued forward, traveling through the windshield and striking the victim. The impact resulted in fatal injuries.

EMPLOYERS

The victim worked for a commercial trucking operation that specializes in the transportation of dairy milk. Established in 1992, the company employs 14 full-time drivers and 12 seasonal drivers. According to the Federal Motor Carriers Safety Administration (FMCSA), the company is registered as an interstate carrier and its trucks travel approximately 1.6 million miles annually.¹

According to FMCSA, the other involved party is a commercial trucking company headquartered out of state. The company employs 36 drivers and operates 55 power units. The company is engaged in interstate commercial and its vehicles travel approximately 5 million miles annually.¹ This company elected not to participate in the FACE investigation; only publicly available information could be accessed.

WRITTEN SAFETY PROGRAMS and TRAINING

The employer of the victim does have a driver policy manual; however, it was not provided to FACE investigators. A company representative stated that the company requires incoming drivers to have two years of commercial driving experience to qualify for employment. Upon hire, a practical skills evaluation is conducted to determine the driver's ability to operate a commercial motor vehicle safely. Upon successful completion of the evaluation, new drivers begin operating a truck immediately. However, new drivers will drive behind or in front of tenured drivers to both loading and unloading destinations until the new driver is comfortable completing all job functions, at which time the new driver is able to operate independently. A company representative stated that the shadow training period varies with the number of years of experience but typically doesn't take more than two weeks. The company stated an FMCSA drug and alcohol random testing program is in place, along with a compliant driver medical certification program.

The other party chose not to participate in the FACE investigation; details are unknown about their safety program.

WORKER INFORMATION

The victim was a 55-year-old non-Hispanic male. The decedent was a high school graduate and had worked for the employer since 2009 as a commercial truck driver. The victim was a career driver, having seven years of commercial truck-driving experience prior to joining the involved company. Total years of experience driving commercial trucks at the time the incident occurred was 22+ years.

According to the police report, the other involved driver is a non-Hispanic male, who holds a valid class A commercial driver's license. Little is known about the other driver due to his company choosing not to participate in the FACE investigation.

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INCIDENT SCENE

The incident initially began in the southbound lanes of a major six-lane interstate highway with a posted speed limit of 70 miles per hour (photo 1). Northbound and southbound travel lanes are separated by a concrete barrier; a standard W-beam guardrail is positioned on the right shoulder of the southbound lanes. The point of first contact occurred in the far-right lane as the commercial semi-truck and trailer traveled south. After initial contact, the truck veered right, where it struck the guardrail and came to final rest on the shoulder of the interstate (photo 2).

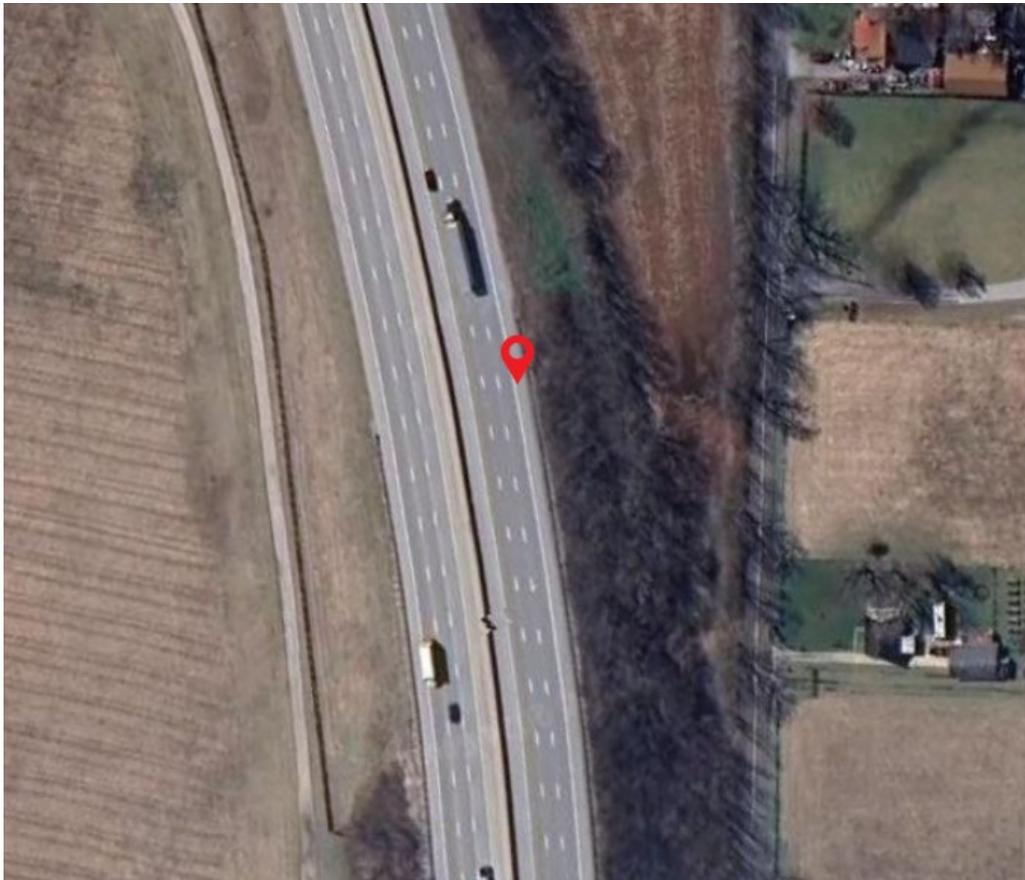


Photo 1. Overhead Google Earth image of Kentucky interstate where the incident occurred. Red location maker indicates approximate location of final rest.

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Photo 2. Photo showing the section of interstate where the incident occurred.
Photo property of Kentucky FACE.

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EQUIPMENT

The victim was operating a 2016 Freightliner Columbia semi-truck with a 2015 Walker food-grade tank trailer in tow (photos 3 & 4).

Equipment information for the other involved party is unavailable and was not included in the traffic collision report provided to FACE investigators.



Photo 3. Google image of a 2016 Freightliner Columbia semi-truck similar to the truck involved in the incident. Photo obtained via Google search on June 10, 2024.



Photo 4. Google image of a 2015 Walker tank trailer similar to the trailer involved in the incident. Photo obtained via Google search on June 10, 2024.

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WEATHER

The weather on the day of the incident was approximately 47 degrees Fahrenheit, 56% humidity, with an 8-mph wind speed out of the south. The weather is not believed to have been a factor in this incident.²

INVESTIGATION

On Monday April 22, 2024, a 55-year-old male commercial truck driver (victim) arrived at work at approximately 9:30 p.m. to gather his supplies and conduct a pre-trip inspection on his semi-truck. Post-inspection, the driver departed the company's out-of-state headquarters en route to pick up his trailer. The trailer was located at a dairy farm approximately 20 miles north of the company's headquarters. Upon arrival, the driver (victim) connected his semi-truck to his tank trailer, which was loaded with 5,800 gallons of raw milk and weighed approximately 49,500 lbs. At 11:00 p.m., the driver (victim), departed for a Kentucky-based milk processing plant located 246 miles away. This trip was a regular dedicated route for the driver, who typically worked five days a week. Approximately three hours later, at 2:00 a.m., while the victim was driving southbound on a major, six-lane Kentucky interstate highway, a semi-trailer wheel and tire that had become detached from a semi-truck and trailer traveling northbound crossed the median and struck the front of the victim's truck. After striking the front of the truck, the wheel and tire combo struck the windshield and continued into the cab of the truck, striking the driver. According to investigators, it is suspected that the driver was killed instantly, as no evidence of attempted braking was located on the highway. Post-impact, the truck veered right, striking the guardrail located on the right shoulder of the highway, which resulted in extensive damage to the passenger's side of the truck. The semi-truck and trailer came to a final rest upright, on the shoulder of the highway, against the guardrail (photo 5 and diagram 1).

A passing motorist contacted emergency services at 2:03 a.m., and a local sheriff's deputy arrived on scene 10 minutes later at 2:13 a.m. The responding deputy reported that the wheel and tire were still in the victim's lap upon his arrival. The victim was presumed deceased, which a coroner who arrived minutes later confirmed. The roadway was shut down for over five hours while investigators worked to clear the highway and investigate the incident; it reopened at 7:18 a.m.

The semi-truck and trailer that lost the trailer wheel and tire did not stop. However, deputies contacted local maintenance shops to inquire about service requests for a semi-truck and trailer missing wheels and/or tires. At 3:00 p.m. on April 23, 2024, a local repair shop employee who had watched media coverage of the collision called to report that a semi-truck and trailer missing two trailer wheels and tires was at their shop for repair. Deputies responded and contacted the driver, who stated he was unaware that a collision had occurred. The driver stated another semi-truck and trailer traveling in the same direction flagged him down by flashing his headlights at approximately 4:00 a.m. to warn him about the missing wheels and tires. After learning of the mechanical failure, the driver reportedly exited the highway, parked, and contacted his company. The company located a repair facility and asked the driver to proceed to the location, which he did at approximately 7:00 a.m. when the shop opened. Deputies concluded that the semi-truck and trailer was the other unit involved in the collision.

CAUSE OF DEATH

According to the death certificate, the cause of death was blunt force trauma.

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Photo 5. Photo showing victim's lane of travel (yellow location marker), direction of travel after initial strike (yellow dotted arrow), and final rest/damage to guardrail (red arrow). Photo property of Kentucky FACE.

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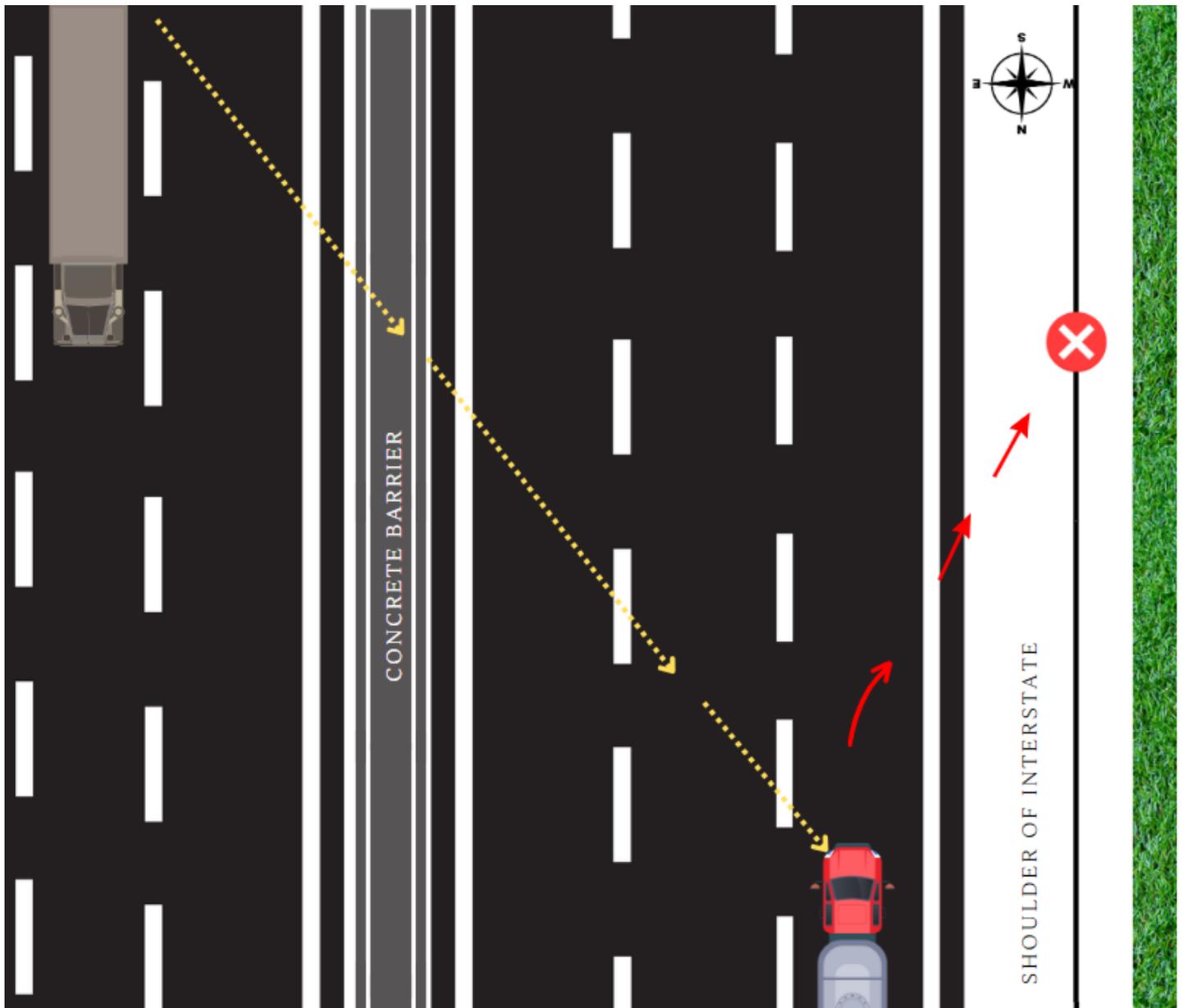


Diagram 1. Diagram showing victim’s direction and lane of travel (red semi-truck) and other involved vehicle’s direction of travel (brown semi-truck). The yellow dotted line represents the approximate path the wheel and tire combo traveled across the concrete barrier to strike the victim’s vehicle. The red arrows represent the approximate path the victim’s vehicle traveled after being struck. The red X represents final rest against the guardrail on the shoulder of the interstate. Diagram property of Kentucky FACE. *Note: Diagram is not to scale.*

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CONTRIBUTING FACTORS

Occupational injuries and fatalities are often the result of one or more contributing factors or key events in a larger sequence of events that ultimately result in the injury or fatality. Kentucky investigators identified the following unrecognized hazards as key contributing factors in this incident:

- Mechanical failure

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Consider installing wheel separation prevention devices.

Discussion: The National Transportation Safety Board (NTSB) estimates that 750 to 1,050-wheel separation accidents occur annually but states that numbers could be much higher due to incidents being unreported.³ According to [FULLBAY](#), a heavy-duty repair shop software provider, the top reasons wheel-off incidents occur is bearing failure or wheel fastener defects.⁴

Wheel separation prevention devices target both types of failures and can be utilized to eliminate wheel separating incidents.

[Tether Tech Safety](#), an Oklahoma-based company, has created a product that aims to eliminate wheel separation due to bearing and/or wheel fastener failure. The hub system utilizes a steel cable that runs through the axle tube and tethers the wheel to the endcaps, eliminating the possibility of wheel separation when hub and/or wheel fasteners fail.⁵



Photo 7. Photo showing the Tether Tech System. Photos obtained from www.fleetowner.com.

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[Zafety Lug Lock](#), a product designed and developed by Tafcan Consulting Ltd., aims to prevent wheel fasteners from backing off. The device is installed over two adjacent lug nuts and creates enough resistance between the two lug nuts to minimize their ability to rotate and fall off, thus preventing wheel fastener-related incidents.⁶



US Pat. 8708627 B2*, CA Pat. 2,637,356
Made in Canada

Photo 6. Photos showing [Zafety Lug Lock](#) device. Photos obtained from Zafetyluglock.com

Kentucky FACE does not endorse any specific products, but investigators suggest that commercial carriers consider using wheel separation prevention devices to reduce the likelihood of wheel separation incidents.

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Recommendation #2: Consider providing hub and wheel-specific training to maintenance technicians.

Discussion: Wheel and hub components can differ significantly from manufacturer to manufacturer. Proper maintenance of each type can vary depending on the make and model. It's imperative that maintenance technicians know the proper procedures of each make and model to repair and maintain wheel and wheel-bearing components properly.

According to an article published by Truckinginfo.com, key areas of focus for maintenance technicians should be proper bearing installation and adjustments based on the manufacturer's procedure, wheel and hub preparation, torquing fasteners to manufacturer's standard, and understanding when a wheel-end part can be reused versus when it should be replaced.⁷

Fleetmaintenance.com states that the best prevention of wheel separation incidents is proper training for technicians so that they can properly identify the type of wheel end being worked on and know how to service each system correctly, the proper procedure for manual adjustment, and what components to use for proper installation of pre-adjusted systems.⁸

Many manufacturers can provide wheel-end installation training to technicians. Additional training and certifications are also available through the [Tire Industry Association](#).

Kentucky FACE investigators suggest that commercial carriers consider providing hub and wheel-specific training to their maintenance technicians.

Recommendation #3: Train and Require Drivers of Commercial Motor Vehicles to Conduct Thorough Equipment Inspections and Enforce the Requirement.

Discussion: An in-depth inspection of wheel components can be an effective way to proactively observe warning signs of defective equipment that may lead to wheel separation incidents. Equipment inspections are critical to identifying potential hazards associated with a vehicle's mechanical readiness, and they are required by law. Part 396.11 of the Federal Motor Carriers Safety Administration states that "every motor carrier shall require its drivers to report, and every driver shall prepare in writing at the completion of each day's work on each vehicle operated". The report shall cover at least the following parts and accessories:

- Service brakes, including trailer connections
- Parking brake
- Steering mechanism
- Lighting devices and reflectors
- Tires
- Horn
- Windshield wipers
- Rear vision mirrors
- Coupling devices
- Wheels and rims
- Emergency equipment

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The report must identify the vehicle and list any defect or deficiency discovered by or reported to the driver that would affect the safety of operation of the vehicle or result in its mechanical breakdown. If a driver operates more than one vehicle during the day, a report must be prepared for each vehicle operated. Drivers are not required to prepare a report if no defect or deficiency is discovered by or reported to the driver.

Prior to requiring or permitting a driver to operate a vehicle, every motor carrier or its agent shall repair any defect or deficiency listed on the driver vehicle inspection report that would be likely to affect the safety of operation of the vehicle.

Every motor carrier or its agent shall certify on the driver vehicle inspection report that lists any defect or deficiency that the defect or deficiency has been repaired or that repair is unnecessary before the vehicle is operated again.⁹ Conducting inspections is vital to identifying defects with wheels and tires that can result in wheel-separation incidents.

Key items to check when inspecting wheels and tires are wheel cracks, unseated lug nuts, wheel seal leaks, wheel hub lubricant levels, elongated stud holes, and oil-soaked brake linings. To help prevent wheel-separation incidents, commercial carriers should train drivers on the signs of wheel-end failure, require drivers to conduct thorough equipment inspections, and hold drivers accountable to the inspection process.

Recommendation #4: Consider implementing an auditing process to ensure compliance with company procedures.

Discussion: Implementing an auditing procedure can be a helpful activity to observe adherence to workplace policies, detect non-compliance, create coaching opportunities, and increase accountability. Audits should take place frequently and at regular intervals. Audits can be planned, random, or both. Both types of audits have pros and cons:

Planned Audits	
Pros	Cons
Can be scheduled to ensure that all individuals demonstrate regular competency with policy and procedure.	Unable to determine behavior during the routine course of duties.
Scenarios can provide feedback on individual's ability to apply policy/procedure appropriately based on the situation.	

Random Audits	
Pros	Cons
Ability to assess adherence during normal work.	Requires larger number of audits throughout all shifts.

Retraining and auditing should also take place whenever there is a change to policy, employee expectation, or equipment.¹⁰



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To help prevent future occurrences, employers should consider auditing driver's pre-trip inspection process to validate that thorough pre-trip vehicle inspections are being conducted, including the inspection of wheel and wheel bearings. Employers should also audit maintenance technicians to verify that wheel and wheel bearings are being maintained in accordance with manufacturers' recommendations.

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INVESTIGATOR INFORMATION

This investigation was conducted by Beau Mosley, Fatality Investigator, Fatality Assessment and Control Evaluation, Kentucky Injury Prevention and Research Center, University of Kentucky, College of Public Health.

ACKNOWLEDGMENT

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